arranged to ensure the proper distribution of weight to the various wheels of the steam locomotive, maintained approximately level and in a safe and suitable condition for service. Adjusting weights by shifting weights from one pair of wheels to another is permissible.

(b) *Spring or spring rigging condemning defects.* Springs or spring rigging with any of the following defects shall be removed from service immediately and renewed or properly repaired:

(1) Top leaf broken or two leaves in top half or any three leaves in spring broken. (The long side of a spring to be considered the top.) Broken springs not exceeding these requirements may be repaired by applying clips providing the clips can be made to remain in place;

(2) Any spring with leaves excessively shifting in the band;

(3) Broken coil springs; or

(4) Broken driving box saddle, equalizer, hanger, bolt, or pin.

WHEELS AND TIRES

§ 230.112 Wheels and tires.

(a) *Mounting.* Wheels shall be securely mounted on axles. Prick punching or shimming the wheel fit will not be permitted. The diameter of wheels on the same axle shall not vary more than 3/32 inch.

(b) *Gage.* Wheels used on standard gage track will be out of gage if the inside gage of flanges, measured on base line is less than 53 inches or more than 53⅜ inches. Wheels used on less than standard gage track will be out of gage if the inside gage of flanges, measured on base line, is less than the relevant track gage less 3½ inches or more than the relevant track gage less 3⅛ inches.

(c) *Flange distance variance.* The distance back to back of flanges of wheels mounted on the same axle shall not vary more than ¼ inch.

(d) *Tire thickness.* Wheels may not have tires with a minimum thickness less than that indicated in the table in this paragraph (d). When retaining rings are used, measurements of tires to be taken from the outside circumference of the ring, and the minimum thickness of tires may be as much below the limits specified earlier in this paragraph (d) as the tires extend between the retaining rings, provided it does not reduce the thickness of the tire to less than 1⅛ inches from the throat of flange to the counterbore for the retaining rings. The required minimum thickness for tires, by wheel center diameter and weight per axle, is as follows:

Weight per axle (weight on drivers divided by number of pairs of driving wheels)	Diameter of wheel center (inches)	Minimum thickness (inches)
30,000 pounds and under	44 and under	1 1/4
	Over 44 to 50	1 5/16
	Over 50 to 56	1 3/8
	Over 56 to 62	1 7/16
	Over 62 to 68	1 1/2
	Over 68 to 74	1 9/16
	Over 74	1 5/8
Over 30,000 to 35,000 pounds	44 and under	1 5/16
	Over 44 to 50	1 3/8
	Over 50 to 56	1 7/16
	Over 56 to 62	1 1/2
	Over 62 to 68	1 9/16
	Over 68 to 74	1 5/8
	Over 74	1 11/16
Over 35,000 to 40,000 pounds	44 and under	1 3/8
	Over 44 to 50	1 7/16
	Over 50 to 56	1 1/2
	Over 56 to 62	1 9/16
	Over 62 to 68	1 5/8
	Over 68 to 74	1 11/16
	Over 74	1 3/4
Over 40,000 to 45,000 pounds	44 and under	1 7/16
	Over 44 to 50	1 1/2
	Over 50 to 56	1 9/16
	Over 56 to 62	1 5/8
	Over 62 to 68	1 11/16
	Over 68 to 74	1 3/4
	Over 74	1 13/16

Weight per axle (weight on drivers divided by number of pairs of driving wheels)	Diameter of wheel center (inches)	Minimum thickness (inches)
Over 45,000 to 50,000 pounds	44 and under	1½
	Over 44 to 50	1 9/16
	Over 50 to 56	1⅝
	Over 56 to 62	1 11/16
	Over 62 to 68	1¾
	Over 68 to 74	1 13/16
	Over 74	1⅞
Over 50,000 to 55,000 pounds	44 and under	1 9/16
	Over 44 to 50	1⅝
	Over 50 to 56	1 11/16
	Over 56 to 62	1¾
	Over 62 to 68	1 13/16
	Over 68 to 74	1⅞
	Over 74	1 15/16
Over 55,000 pounds	44 and under	1⅝
	Over 44 to 50	1 11/16
	Over 50 to 56	1¾
	Over 56 to 62	1 13/16
	Over 62 to 68	1⅞
	Over 68 to 74	1 15/16
	Over 74	2

(e) *Tire width*. Flanged tires shall be no less than 5½ inches wide for standard gage and no less than 5 inches wide for narrow gage. Plain tires shall be no less than 6 inches wide for standard gage and no less than 5½ inches wide for narrow gage.

§ 230.113 Wheels and tire defects.

Steam locomotive and tender wheels or tires developing any of the defects listed in this section shall be removed from service immediately and repaired. Except as provided in § 230.114, welding on wheels and tires is prohibited. A wheel that has been welded is a welded wheel for the life of the wheel.

(a) *Cracks or breaks*. Wheels and tires may not have a crack or break in the flange, tread, rim, plate, hub or brackets.

(b) *Flat spots*. Wheels and tires may not have a single flat spot that is 2½ inches or more in length, or two adjoining spots that are each two or more inches in length.

(c) *Chipped flange*. Wheels and tires may not have a gouge or chip in the flange that is more than 1½ inches in length and ½ inch in width.

(d) *Broken rims*. Wheels and tires may not have a circumferentially broken rim if the tread, measured from the flange at a point ⅝ inch above the tread, is less than 3¾ inches in width.

(e) *Shelled-out spots*. Wheels and tires may not have a shelled-out spot 2½ inches or more in length, or two adjoining spots that are each two or more inches in length, or so numerous as to endanger the safety of the wheel.

(f) *Seams*. Wheels and tires may not have a seam running lengthwise that is within 3¾ inches of the flange.

(g) *Worn flanges*. Wheels and tires may not have a flange worn to a 15/16 inch thickness or less, as measured at a point ⅜ inch above the tread.

(h) *Worn treads*. Wheels and tires may not have a tread worn hollow 5/16 inch or more.

(i) *Flange height*. Wheels and tires may not have a flange height of less than 1 inch nor more than 1½ inches, as measured from the tread to the top of the flange.

(j) *Rim thickness*. Wheels may not have rims less than 1 inch thick.

(k) *Wheel diameter*. Wheels may not have wheel diameter variance, for wheels on the same axle or in the same driving wheel base, greater than 3/32 inch, when all tires are turned or new tires applied to driving and trailing wheels. When a single tire is applied, the diameter must not vary more than 3/32 inch from that of the opposite wheel on the same axle. When a single pair of tires is applied the diameter must be within 3/32 inch of the average diameter of the wheels in the driving wheel base to which they are applied.